

# Section 1-3

Measures of Center



# In-Class Activity (p. 19)

- ◆ Why? So we can analyze data in various ways
- ◆ How do you enter data?
- ◆ How do you find characteristics of the data?



Mean: Just another word for the average; add it all up, then divide by the total number

Median: The middle value of a data set when put in order  
If there is an even number of values, you have to take the average of the two middle terms

Mode: The value that shows up the most  
Hint: The m“O”de shows up the m“O”st

Sigma ( $\Sigma$ ): It's a Greek letter (we'll see lots of these this year). We use this letter for “summation”



# Summation Notation

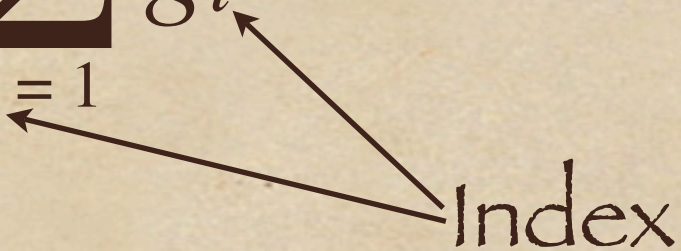
$$\sum_{i=1}^{10} g_i$$


Diagram illustrating the components of the summation notation  $\sum_{i=1}^{10} g_i$ . The word "Index" is shown with two arrows pointing to the  $i$  in the subscript  $i=1$  and the  $i$  in the term  $g_i$ .

The sum of the first ten terms is  $g_i$

Index: Tells us where on the list the value is



# Example 1

Refer to the table on page 20, dealing with the ages of actors and actresses when they won the Oscar for Best Actor/Actress. Write the summation notation for each set of data.

$$\text{Men: } \sum_{i=1}^{25} m_i = 1134$$

$$\text{Women: } \sum_{i=1}^{25} w_i = 1012$$



A statistical way of defining the mean:

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n}$$

or

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$



# Example 2

Consider the set  $\{x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8\}$

- a. Represent the sum of the elements in the set in summation notation.

$$\sum_{i=1}^8 x_i$$

- b. What expression represents the mean of the elements of the set?

$$\bar{x} = \frac{\sum_{i=1}^8 x_i}{8}$$



c. From the given information, can the median of the set be determined? If not, explain why it cannot be determined.

Do we know the actual values?

No

Then how can we put them in order?

We can't!



# Example 3

Find the median age of the women winning Wimbledon singles championships from 1970 to 1990.

1		9 9 9
2		1 1 2 0 7 8 9 8 6 5 6 7 8 9
3		1 1 0 3



# Example 4

The chart below gives information about the heights of players on the varsity team at Matt Mitarnowski Memorial High School.

Height in inches	67	69	70	71	72	74	79
Number of players	1	3	3	2	2	1	1



a. How many members are on the team?

There are 13 members on the team

b. Find the mean height.

$$\bar{x} = \frac{\sum_{i=1}^{13} x_i}{13} = \frac{923}{13} = 71 \text{ inches}$$

c. Find the median height.

70 inches



d. Which number, the mean or median, best describes the typical height of a member of the team? Why?

The median better describes the team, as there is a high number (an outlier...79) which makes the average higher.



# Example 5

A class has 20 students. Let  $g_i$  = the test grade of the  $i^{\text{th}}$  student.

a. Use summation notation to express the total of the test grades for the class.

$$\sum_{i=1}^{20} g_i$$



b. What does  $\frac{\sum_{i=1}^{20} g_i}{20}$  represent?

The mean of the test scores for the class.



# Homework

p. 25 #1 - 24



